# MANUAL SPECIAL SITUATIONS GD 41SS

# MANUAL SPECIAL SITUATIONS

## OBJECTIVE:

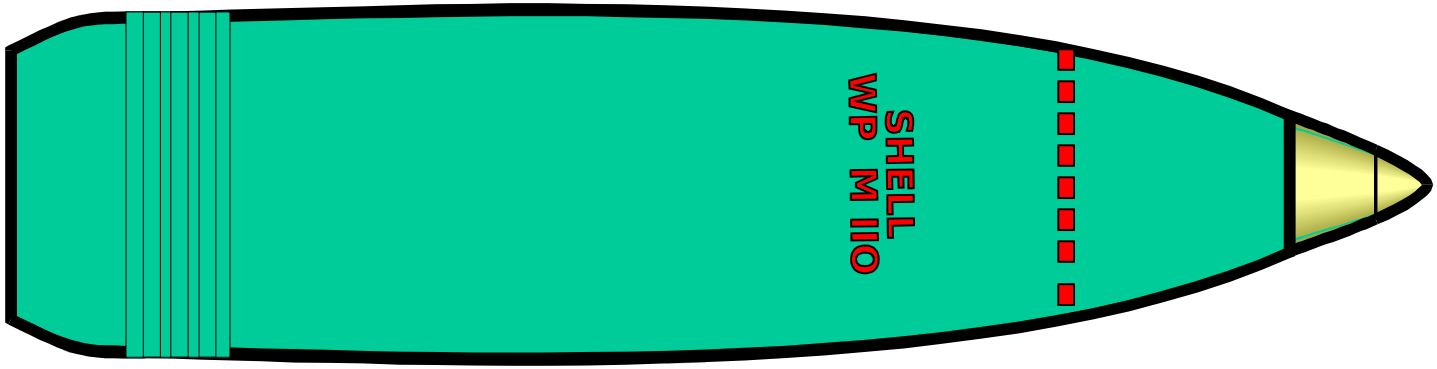
TO PROCESS THE FOLLOWING AREA FIRE MISSIONS:

1. NON STD SQUARE WEIGHT PROJECTILE
2. HIGH EXPLOSIVE PROJECTILE AT HIGH ANGLE FIRE.
3. SHELL DPICM
4. SHELL ILLUMINATION

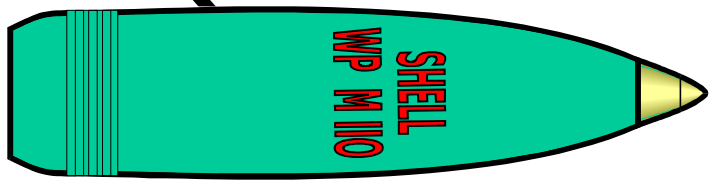
# WHAT YOU NEED TO KNOW!

1. HOW TO COMPENSATE FOR NON-STANDARD WEIGHT PROJECTILES.
2. DETERMINE DATA FOR HIGH ANGLE FIRE.
3. DETERMINE DATA FOR SHELL ILLUMINATION.
4. DETERMINE FIRING DATA FOR DUAL PURPOSE IMPROVED CONVENTIONAL MUNITIONS (DPICM).

# PROCESS AN AREA FIRE MISSION FOR A NON-STANDARD WEIGHT PROJECTILE USING SHELL WHITE PHOSPHOROUS



THIS IS A PROCEDURE IN WHICH
WE COMPENSATE FOR THE VARIATION FROM THE STANDARD WEIGHT OF A PARTICULAR PROJECTILE OR FROM THE WEIGHT OF A REGISTERED PROJECTILE WHEN FIRING A SHELL WITH A DIFFERENT SQUARE
IGHT (

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8 ▣

# SQUARE WEIGHT:

VARIATIONS IN WEIGHT ARE INHERENT IN THE MANUFACTURE OF PROJECTILES.

SINCE A HIGH DEGREE OF ACCURACY IS REQUIRED IN ARTILLERY FIRING, THE WEIGHT OF A PATICULAR LOT OF PROJECTILES MUST BE DETERMINED AND COMPARED WITH THE DATA PROVIDED IN THE FIRING TABLE OR WITH THE WEIGHT OF A REGISTERED PROJECTILE TO OBTAIN THE PROPER BALLISTIC CORRECTIONS.

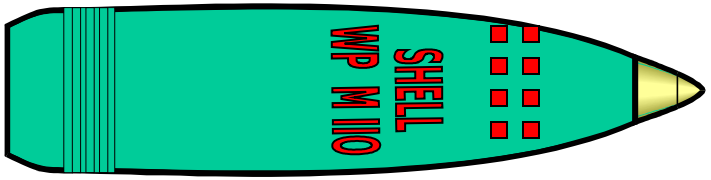
# PROJECTILE INFORMATION

## ACCURATE AMMUNITION INFORMATION IS ONE OF THE ***FIVE REQUIREMENTS OF ACCURATE PREDICTED FIRE***

**SQUARE WEIGHT IS PART OF THE AMMO INFORMATION THAT IS AVAILABLE FROM THE XO, AMMO TECHNICIAN OR THE GUN LINE.**

***STENCILED ON THE OGIVE***

**4▣ SQ**




**8▣ SQ**

# TFT INFORMATION

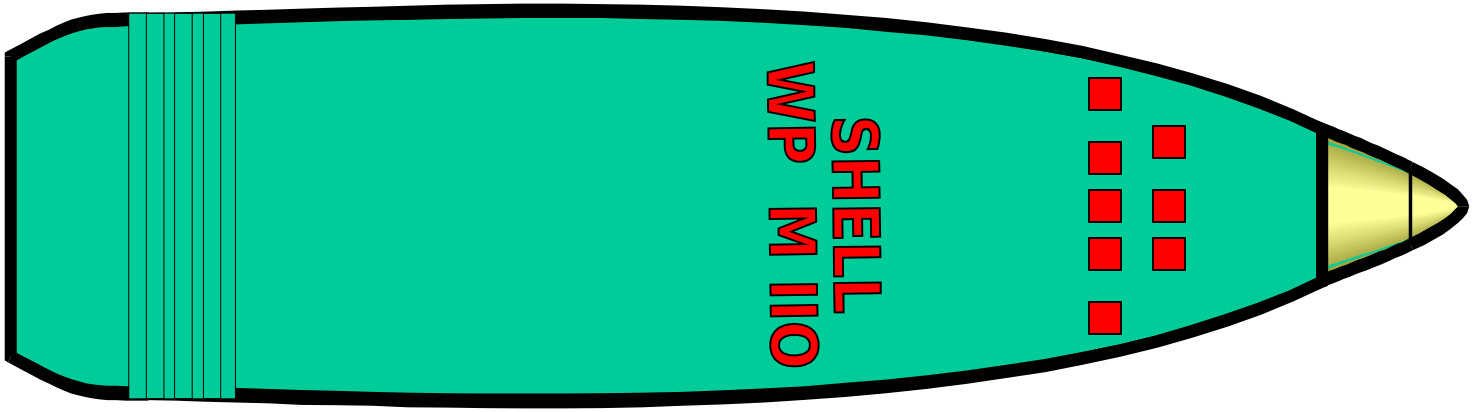
**FIRING DATA IN THE TFT OR GFT IS BASED ON STANDARD CONDITIONS, ONE OF WHICH IS STANDARD WEIGHT OF THE PROJECTILE.**

**STANDARD WEIGHT AND POSSIBLE DEVIATIONS FROM THAT WEIGHT ARE FOUND IN THE INTRODUCTION OF THE APPROPRIATE TFT.**

*( TURN TO PAGE XI IN AM-2 TFT )*

# SHELL WP M110

## WHITE PHOSPHOROUS SMOKE



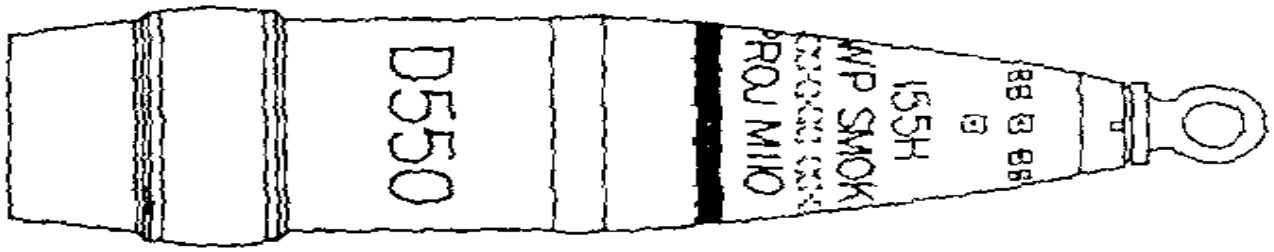
# M110 WP SMOKE CONTAINS

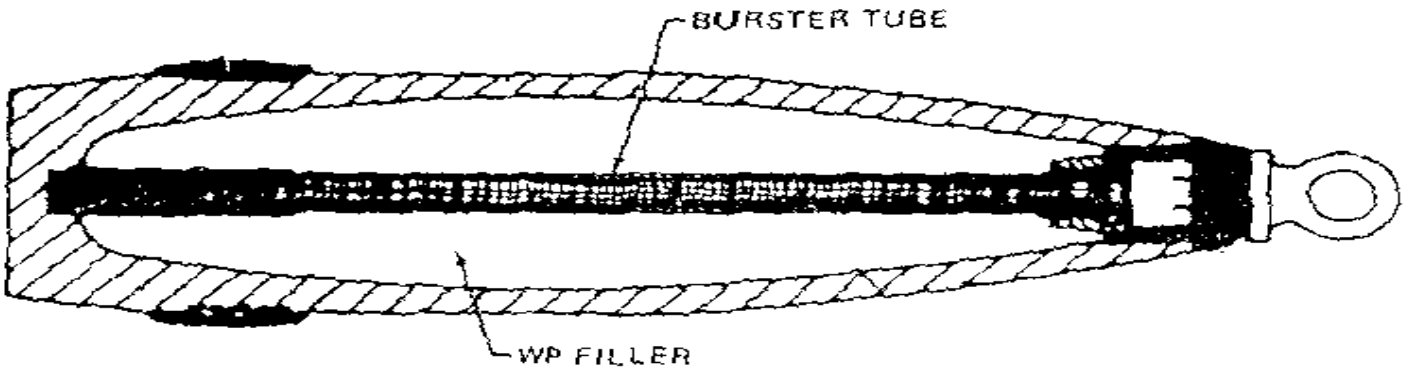
A FILLER OF WHITE PHOSPHOROUS INSIDE A CARRIER SHELL, BALLISTICALLY SIMILAR TO THE M107- HE.

A BURSTER TUBE EXPLODES ON FUZE FUNCTION TO BURST THE SHELL AND SPREAD THE WP.

THE WP IGNITES ON CONTACT WITH AIR PROVIDING DENSE SMOKE

PROJECTILE, 155-MILLIMETER: SMOKE, WP, M110



?
M110
WP
SMOKE

# FFE MISSION,SHELL WP:

## TURN TO PE#1 pg 5

## KNOWN AMMUNITION INFORMATION TO THE FDC INCLUDES:

WT OF HE PROJECTILE 4 SQ, LOT A

WT OF WP PROJECTILE 8 SQ, LOT W

**"REGISTRATION HAS BEEN CONDUCTED GFT SETTING IS AVAILABLE"**

# WHITE PHOSPHOROUS PE # 1

## GFT SETTING:

**GFT: I, CHG 4, LOT AG, RG 3200, EL 182, TI 10.8,**

**TOT R6 GFT R9**

**CALL FOR FIRE:**

**W32 de W34, FFE POLAR O**
**DIR 1750, DIST 2150**
**TANK COLUMN REFUELING WP OVE**

FIRE ORDER: ④ LOT WG

INITIAL CHART DATA:

CHART RG: 4860

CHART DEFLECTION: 2985

# DETERMINE THE DIFFERENCE IN SQUARE WEIGHT:

THE DIFFERENCE WILL BE EITHER A DECREASE OR INCREASE FROM STANDARD OR THE WEIGHT OF THE REGISTERED PROJECTILE.

**EXAMPLE**

**WP 8 SQ**

***HE 4 SQ**

**INC 4 SQ**

# DETERMINE THE CORRECTION FACTOR

1. FROM THE APPLICABLE TFT: FT 155-AM-2
2. TABLE F FIRING DATA AND RANGE CORRECTION FACTORS FOR VARIOUS NONSTANDARD CONDITIONS. (ONE OF THEM BEING PROJECTILE WEIGHT )
3. LISTED IN COLUMNS 18 AND 19.
4. COL. 18 IS FOR DECREASE COL. 19 IS FOR INCREASE. (EACH VALUE IS FOR A CHANGE OF ONE SQUARE).
5. TO DETERMINE THE REQUIRED VALUE, TAKE THE CHART RANGE AND EXPRESS IT TO THE NEAREST 100 METERS. ( THIS IS OUR ENTRY RANGE)

# WE HAVE ALREADY DETERMINED THE DIFFERENCE IN SQUARE WEIGHT AS AN INCREASE OF 4 SQ.

1. CHART RG 4860 ~ **4900** (ENRTY RG)
2. ENTER TFT 4 GB, TBL F, COL 19 "INC"
3. CORR FACTOR **+33**

# TO DETERMINE RANGE CORRECTION

**CORR FACTOR +33 = INC OF 1 SQ**

**OUR MISSION HAS AND INC OF 4 SQ**

**CORR FAC +33 (TFT/Tbl F, Col 19, Rg 4900 )**

**X INC 4 [*] SQ**

**RG CORR 132 ~ +130 (NEAREST 10 METERS)**

# DETERMINE CORRECTED RANGE

**APPLY THE RANGE CORRECTION TO THE ANNOUNCED CHART RANGE**

***NOT THE EXPRESSED ENTRY RANGE.***

**CHT RG 4860**

**RG CORR + 130**

**CORR RG 4990**

**ROF**

**REMEMBER TGT HAS NOT MOVED,**

**WE MUST AIM BEYOND THE TGT IN ORDER TO CAUSE THE HEAVIER WP PROJECTILE TO HIT THE TGT.**

# DETERMINE FIRING DATA:

## USE BOTH THE CORRECTED RG AND THE CHART RG TO DETERMINE DATA.

***HELPS TO REMEMBER THE FUNCTIONS OF THE GFT***

# DATA FROM CORRECTED RANGE:

1. **DETERMINE ELEVATION FROM CORRECTED RANGE.**
2. **SINCE DRIFT IS A FUNCTION OF ELEVATION, DETERMINE IT ON EL.**
3. **TIME OF FLIGHT IS ALSO A FUNCTION OF EL.**

**DATA FROM CORRECTED RANGE**

**1- ELEVATION, 2- DRFT FROM EL, 3- TOF FROM EL.**

# DATA FROM CHART RANGE

*REMEMBER THE TGT HAS NOT MOVED

IT IS ACTUALLY AT THE RANGE DETERMINED BY THE HCO.

THE MOST IMPORTANT PIECE OF DATA DETERMINED USING THE CHART RANGE IS ***SITE***

USING CHART RANGE THE SITE IS COMPUTED BY THE VCO.

ADDITIONAL INFO DETERMINED 100/R AND Per.

# COMPLETE FIRE COMMANDS, ANNOUNCE TO GUNS, POLICE ROF.

1. INSURE THAT FIRE COMMANDS FOR SHELL AND LOT REFLECT WHAT IS TO FIRED.
2. ANNOUNCE ALL REQUIRED FIRE COMMANDS.
3. THEY NEED TO BE ANNOUNCED SINCE THEY VARY FROM THE COMMAND STANDARDS.
4. POLICE RECORD OF FIRE.

# CONTINUATION OF MISSION:

**CONTINUE TO PROCESS ANY SUBSEQUENT REQUESTS FROM THE OBSERVER.**

**END THE MISSION WHEN REQUIRED AND POLICE THE ROF.**

# AF MISSION, WP IN EFFECT:

IF THE OBSERVER IS NOT CONFIDENT IN HIS TGT LOCATION OR IF THE FIRING UNIT IS NOT FIRING ACCURATELY, WE MAY NEED TO ADJUST FIRE.

ADJUSTMENTS WILL NORMALLY BE MADE WITH SHELL HE, FZ Q, AS WE DISCUSSED EARLIER WHEN FIRNG FZ VT IN THE EFFECT PHASE OF THE MISSION.

SHELL HE, FUZE Q WOULD BE FIRED UNTIL, FIRE FOR EFFECT IS REQUESTED

AT THE REQUEST OF THE OBSERVER FOR FIRE FOR EFFECT, SHELL WP WOULD BE FIRED AND THE FIRE COMMANDS WOULD BE CHANGED ACCORDINGLY.

DRIFT AND SITE IS DETERMINED FOR THE FIRST ROUND FIRED AND CARRIED THROUGH THE ENTIRE MISSION.

IT WOULD NOT BE CHANGED IN THE WP FFE PHASE.

THE CORRECTION FACTOR AND THE RANGE CORRECTION IS DETERMINED USING THE FIRE FOR EFFECT CHART RANGE.

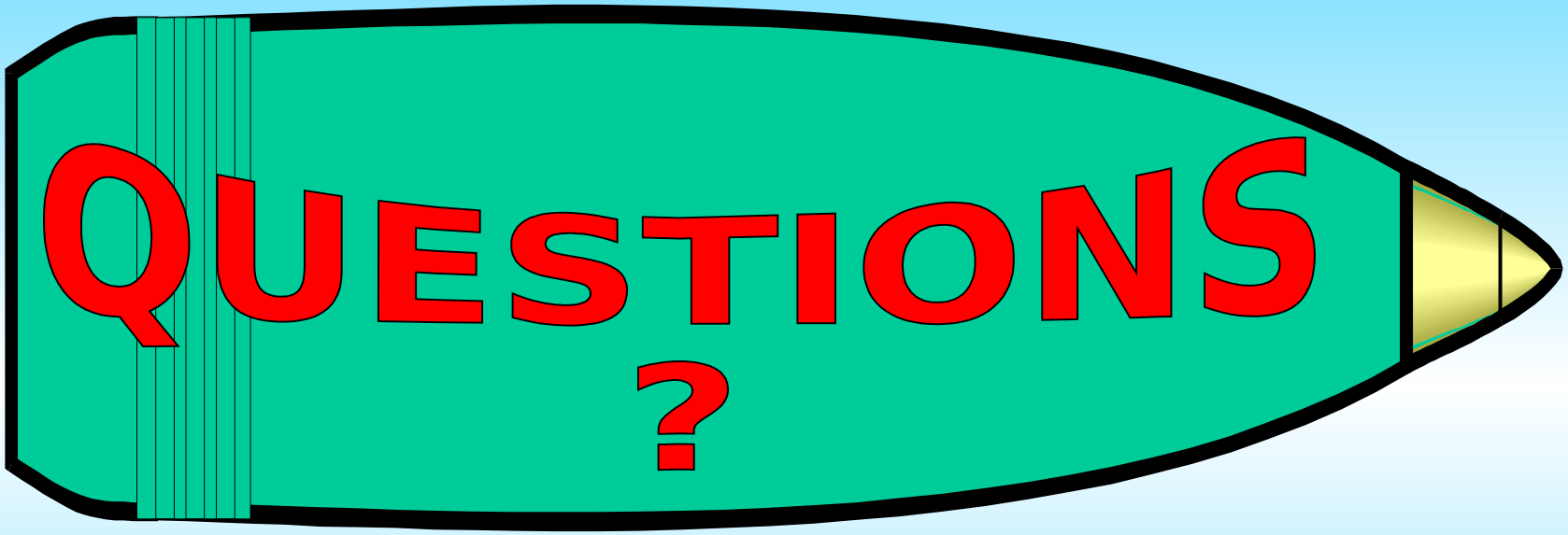
THE RG CORRECTION IS APPLIED TO THE FFE CHART RANGE TO DETERMINE THE CORRECTED RANGE.

THIS IS DUE TO THE HEAVIER PROJECTILE.

# FIRING A NON-STANDARD SHELL

THE PROCEDURES THAT YOU HAVE LEARNED CAN BE USED FOR ANY TYPE OF PROJECTILE, NOT JUST WP.

NOW WE CAN FIRE ACCURATELY REGARDLESS OF NON-STANDARD WEIGHT PROJECTILES!!


QUESTIONS
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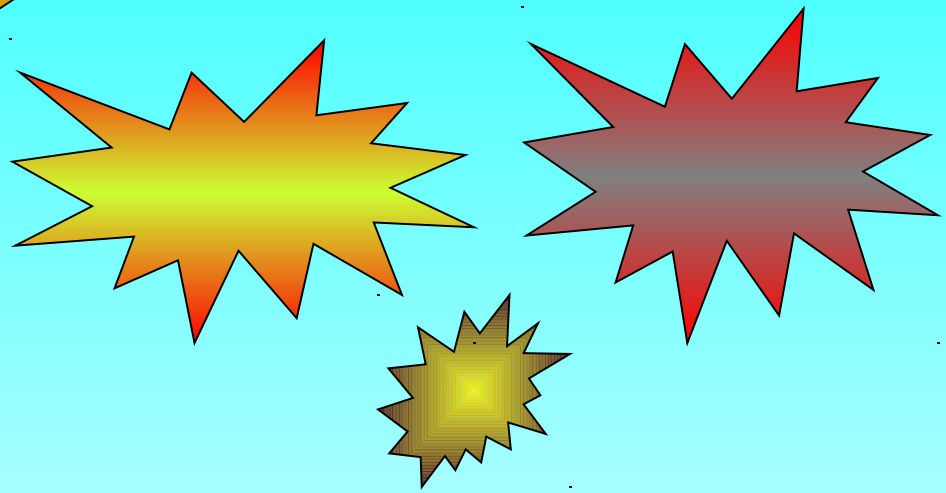
YOUR ON PE TIME

# HIGH ANGLE FIRES



# HIGH ANGLE

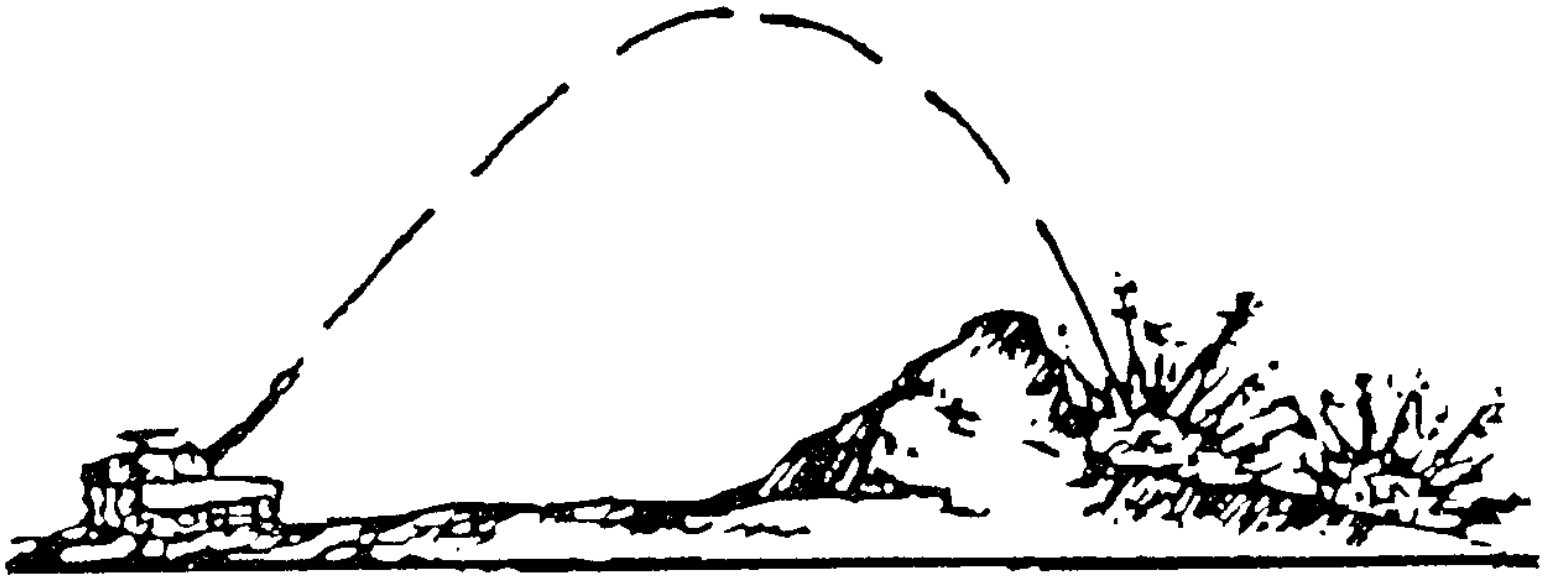
- **FIRES DELIVERED AT ELEVATIONS GREATER THAN THE ELEVATION CORRESPONDING TO THE MAXIMUM RANGE FOR A CHARGE. NORMALLY OCCURS AROUND 800 MILS.**

# CHARACTERISTICS OF HIGH ANGLE

- AS RANGE INCREASES, ELEVATION DECREASES; AS RANGE DECREASES, ELEVATION INCREASES
- REQUESTED BY OBSERVER OR DIRECTED BY FDO
- DRIFT IS VERY LARGE & APPLIED TO EACH CORRECTION
- SITE IS COMPUTED DIFFERENTLY
- LONG TIMES OF FLIGHT
- EASILY DETECTED BY ENEMY RADAR
- LARGE PROBABLE ERRORS
- USES A DIFFERENT GFT

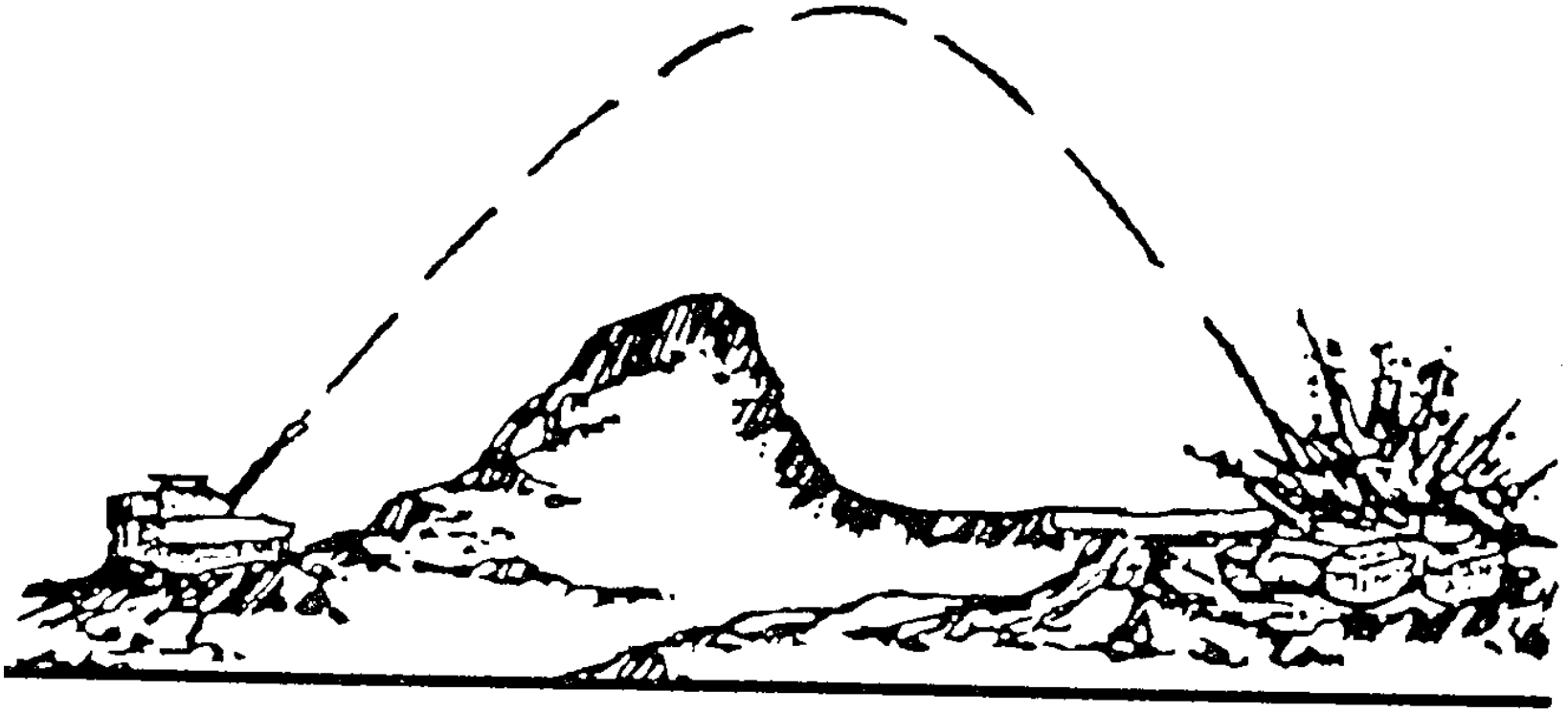
# USES OF HIGH ANGLE FIRE

- **FIRING INTO DEFILADE.**
- **FIRING OUT OF DEFILADE.**
- **FIRING OVER INTERVENING CREST.**
- **FIRING OVER FRIENDLY TROOPS.`**



INTO DEFILADE

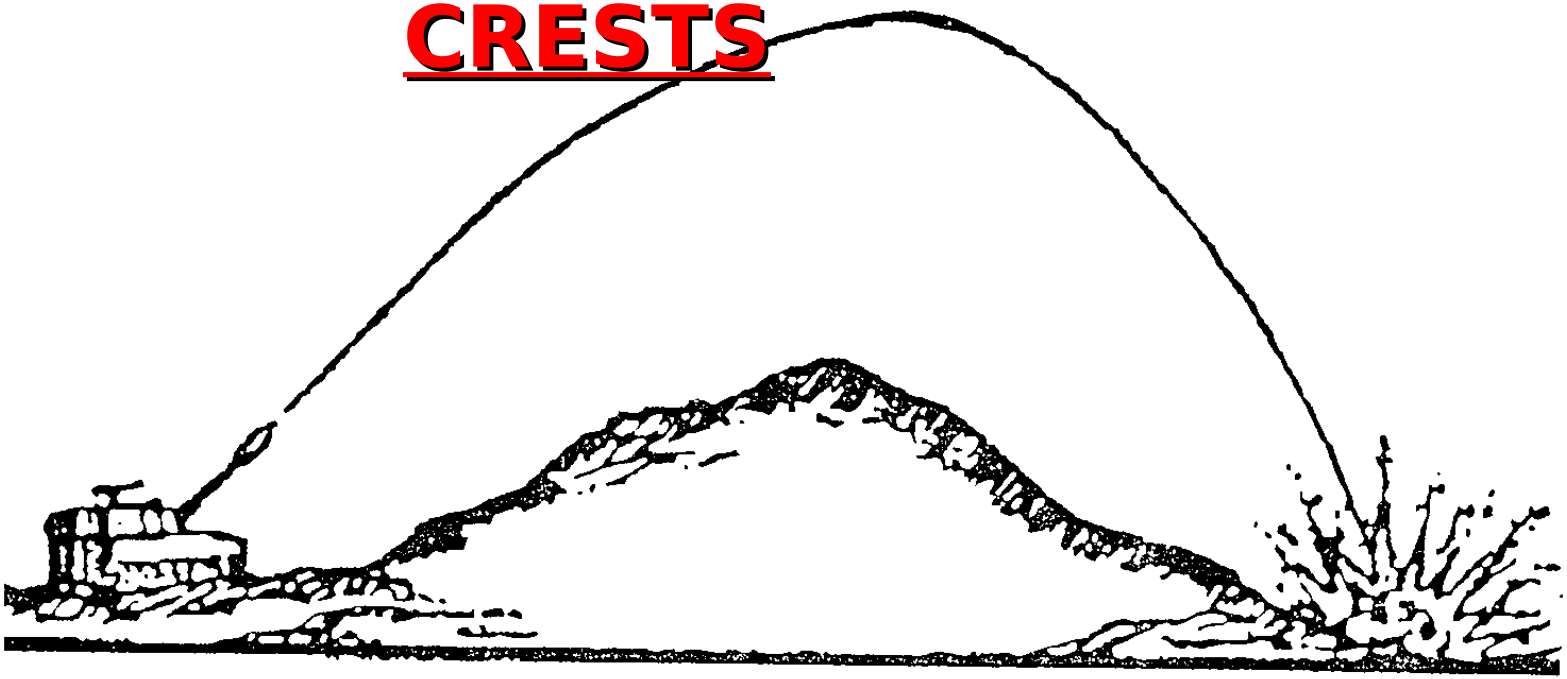
**FIRE ON TGTS LOCATED IN AREAS THAT ARE PROTECTED FROM DIRECT FIRE OR INDIRECT FIRE AT LOW ANGLE. (WOODED AREAS, URBAN AREAS, OR MOUNTAINOUS TERRAIN)**



OUT OF DEFILADE

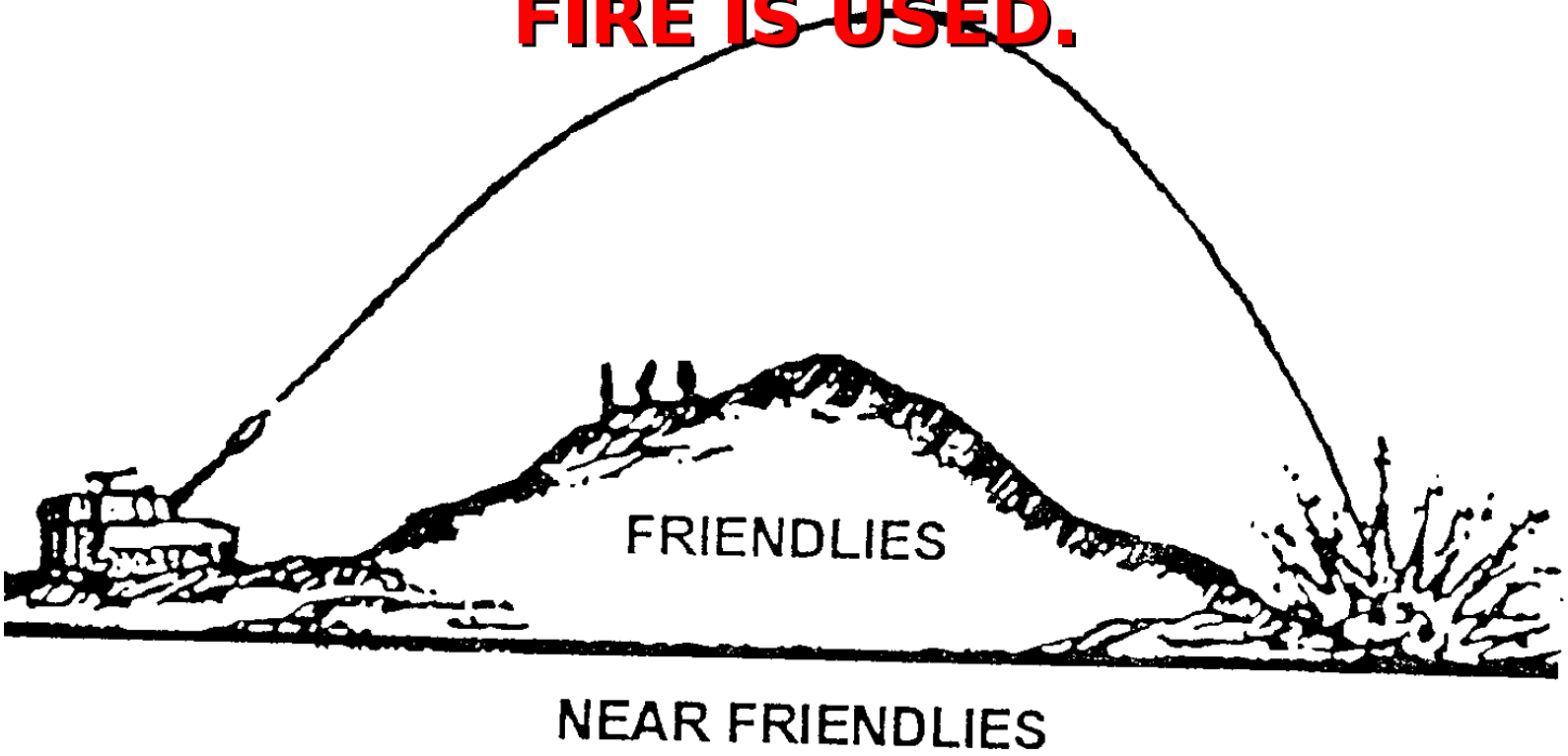
**TACTICAL SITUATION AND TERRAIN MAY M**
**EMPLACING A UNIT IN DEFILADE A NECES**

# INTERVENING CRESTS

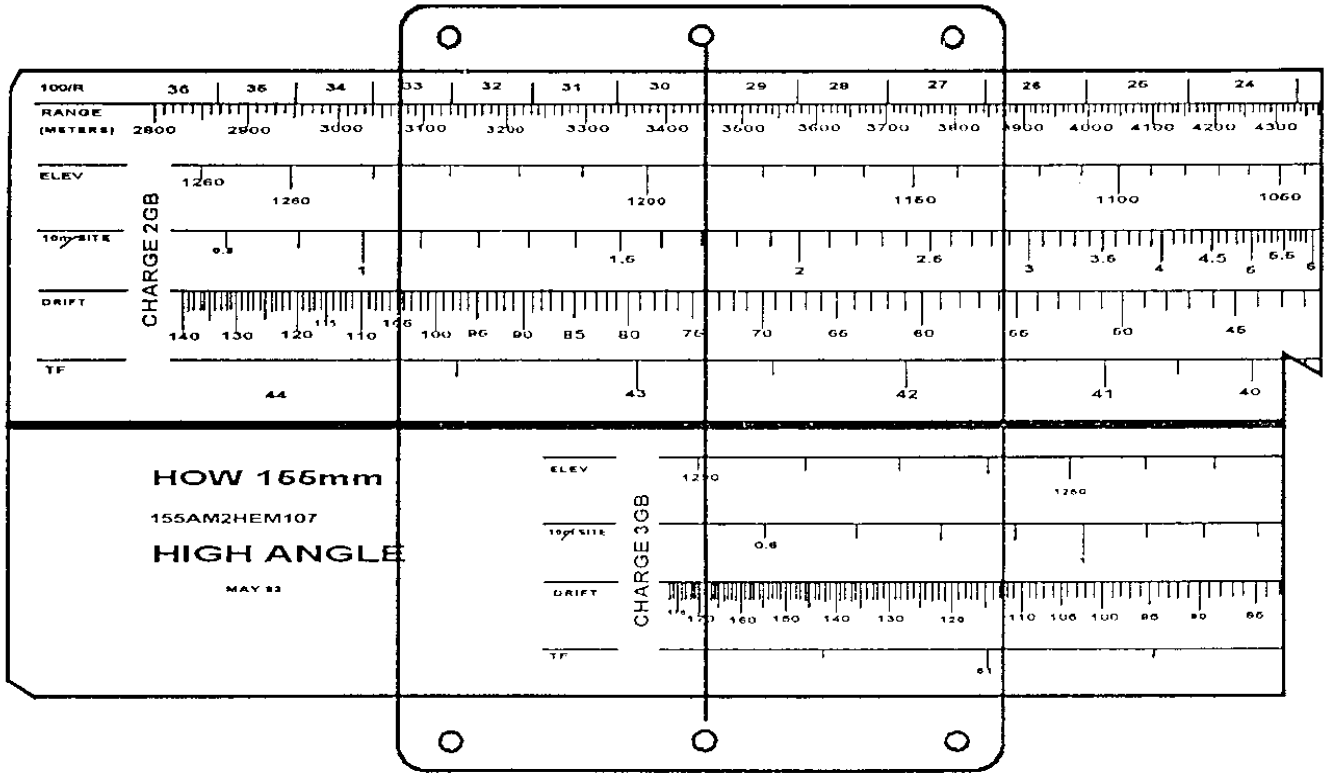


**THESE CRESTS COULD MASK THE FIRES AT ANGLE AND MAY REQUIRE HIGH ANGLE FIRES PASS OVER THEM.**

# TROOPS OCCUPYING HIGH TERRAIN ALONG THEDIRECTION OF FIRE MAY BE IN DANGER IF LOW ANGLE FIRE IS USED.



# " HIGH ANGLE GFT "




High-Angle GFT.

# HIGH ANGLE GFT

- LABELING IS THE SAME AS THE LOW ANGLE GFT EXCEPT THE THIRD LINE INDICATES “HIGH ANGLE” IN PLACE OF CHARGE
- AM-2, GFT: CONTAINS CHARGE SCALES 2-5 GB ON ONE SIDE.
- TURN IT OVER AND CHARGES 6&7 WB, AS WELL AS CHARGE 8, M119A1.

# HIGH ANGLE GFT SCALES

- **RANGE SCALE: runs across the top of the GFT. Read range to the nearest 10 mtrs. Visually interpolate when necessary.**
- **100/R SCALE: above the range scale. Determined to the nearest mil.**
- **ELEVATION SCALE: graduated in 10 mil increments and numbered every 50 mils. "Values decrease to the right" elevation is determined to the nearest mil.**
- **10 MIL SITE FACTOR: the number of mils of site for each 10 mils of angle of site. " the computer uses this scale to determine site"**
- **DRIFT: a larger factor than low angle fire, graduated in 1 mil increments, determined to the nearest L1 mil. "increases from right to left just as the elevation scale, drift is a function of elevation.**
- **TF SCALE: replaces the fuze setting scale. Is used for Time of Flight and VT FS. Graduated in 0.5 increments, numbered every 1 second," increases from right to left"**

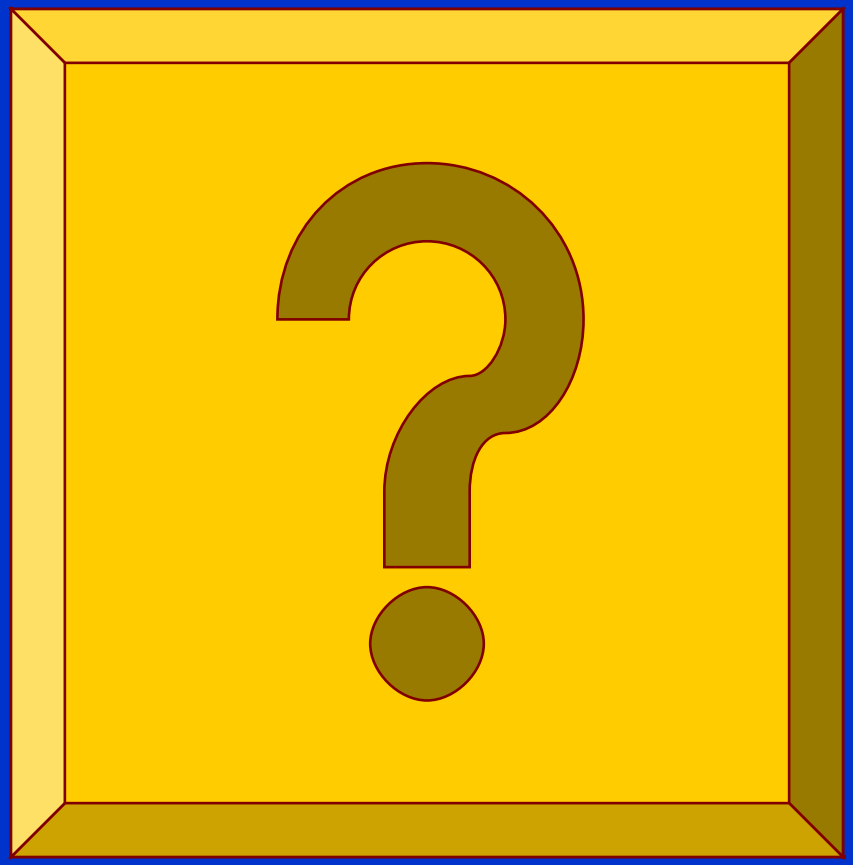
# DUTIES OF FDC FOR HIGH ANGLE FIRE

- **FDO:MUST INCLUDE HA, IN THE FIRE ORDER.**
- **VCO : DETERMINES AND ANNOUNCES ANGLE OF SITE.**
- **COMPUTER:**
- **SELECTS THE CHARGE: 500 MTRS SHORT AND 500 MTRS BEYOND THE INITIAL CHART RANGE.**
- **INCLUDES DRIFT CORRECTION: WITH EVERY CHART DEFLECTION CORRESPONDING TO THE OBSERVERS SUBSEQUENT CORRECTIONS TO DETERMINE THE DF, TO BE FIRED.**
- **COMPUTES SITE: DISCUSS LATER ON HOW TO COMPUTE SITE FOR HIGH ANGLE.**

# DUTIES CONT:

- **FIRE COMMANDS**: INCLUDES SPECIAL INSTRUCTIONS "HIGH ANGLE" IN THE FIRE COMMANDS.
- **TIME OF FLIGHT**: DETERMINE AND ANNOUNCE TO THE RTO.

- **RADIO / TELEPHONE OPERATOR**: ANNOUNCES **TOF** IN THE **MTO** AND ANNOUNCES **SPLASH** FOR EACH ROUND. **"SPLASH IS WARNING SENT TO THE OBSERVER 5 SECONDS BEFORE THE BURST OF THE ROUND"**



# TURN TO PE #1 / PG 22

- **RECORD THE CFF**
- **RECORD THE FIRE ORDER**
- **RECORD THE MTO**

# HIGH ANGLE PE # 1
# PAGE 22

**CALL FOR FIRE:**
**M37 de I73 AF OVER**
**GRID 622 386 OVER**
**INF CO IN DEF HA VT I/E OVER**

**FIRE ORDER: 4**

**MTO: M 4 GD1030**

**INITIAL DATA: CHT RG 5480 CHT DF**
**<T 490**

# CONT:

- **SELECT CHARGE**
- **DETERMINE DRIFT AND DF TO FIRE:**
- **ANGLE OF SITE: VCO DETERMINES TGT ALT, VI, AND AOS. THEN ANNOUNCES AOS TO THE COMPUTER. THE COMPUTER NEEDS AOS TO DETERMINE SITE. "EVEN IF THE FDO DECIDES TO IGNORE THE SITE"**

# DETERMINE SITE

- WILL ALWAYS BE COMPUTED UNLESS DIRECTED TO IGNORE SITE BY THE FDO.
- **HOW TO DETERMINE SITE:**
- **STEP 1:**
- TAKE THE VCO'S ANNOUNCED AOS DIVIDE IT BY 10.
- DETERMINED AND RECORDED TO THE NEAREST TENTH OF A MIL.
- RECORD THE VALUE IN THE BLOCK LABELED **"<Si/10".**
- THIS IS A SIGNED VALUE THAT CARRIES THE SAME SIGN AS THE **VI AND THE AOS.**

# SITE CONT:

- **STEP 2:**
- **COMPUTER THEN DETERMINES 10MIL SITE FACTOR FROM THE GFT.**
- **IT IS DETERMINED AND RECORDED TO THE NEAREST TENTH OF A MIL.**
- **NEXT TO THE <Si/10 BLOCK WE RECORD THE VALUE.**
- **" 10 MIL SITE FACTOR IS ALWAYS A NEGATIVE VALUE"**
- **STEP 3:**
- **ONCE THE TWO VALUES ARE DETERMINED, THE COMPUTER MULTIPLIES THEM TO DETERMINE SITE. SITE EXPRESSED TO THE WHOLE MIL.**

# SITE CONT:

- AND IMPORTANT STEP THAT MUST BE UNDERSTOOD IS THAT

**"THE SIGN FOR SITE WILL BE THE OPPOSITE OF THE SIGN OF THE ANGLE OF SITE"**

# HIGH ANGLE SITE

**HA SITE=(AOS/10)*10M SITE FACTOR~NEAREST 1 MIL**

**CARRIES THE SIGN OPPOSITE THE AOS**

| | | |
|---|---|---|
| **AOS** | **-37.9** | **10 MIL SITE FAC (GFT** |
| **÷** | **10** | **-4.0** |
| **< SITE** | **10** | **-3.8** |

| | | |
|---|---|---|
| **< SITE** | **10** | **-3.8** |
| **X 10 MIL SITE FAC** | | **-4.0** |
| **HA SITE** | | **+15.2 ~ +15** |

# DETERMINE QE

- APPLY THE SITE TO THE ELEVATION SAME AS IN LOW ANGLE FIRE. (Site+Elevation = QE)

- ANNOUNCE FIRE COMMANDS TO GUNS, POLICE ROF: WE MUST NOW SEND THE TIME OF FLIGHT TO THE OBSERVER.

# PROCESS SUBSEQUENT CORRECTIONS

- IN ADJUST FIRE THE OBSERVER WILL ADJUST THE ROUNDS UNTIL HE CAN ACHIEVE EFFECT ON TGT.
- COMPUTE DATA FOR EACH OBSERVER CORRECTION.
- INITIAL SITE IS CARRIED THROUGH FOR THE ENTIRE MISSION.
- DEFLECTION CORR, MUST BE COMPUTED AND APPLIED TO THE DF FOR EACH ROUND FIRED.
- THIS IS BECAUSE DRIFT IS LARGE AND VARIABLE.

# FFE

- DETERMINE AND ANNOUNCE ANY CHANGES TO THE FIRE COMMANDS.
- COMPUTE AND ANNOUNCE A FUZE SETTING (IF REQUIRED).
- VT FUZE SETTING IS DETERMINE FROM THE TOF SCALE.
- CONTINUE TO PROCESS ANY SUBSEQUENT REQUESTS FROM THE OBSERVER.
- END THE MISSION WHEN REQUIRED, AND POLICE YOUR ROF.

# QUESTIONS ?

# DUAL-PURPOSE IMPROVED CONVENTIONAL MUNITIONS (DPICM)

# OBJECTIVE:

- TO PROCESS AN AREA FIRE MISSION USING DUAL PURPOSE IMPROVED CONVENTIONAL MUNITIONS ( DPICM )

**THE DPICM PROJECTILE WAS DESIGNED IN THE COLD WAR TO ASSIST MANEUVER COMMANDERS ENGAGED IN A ARMOR TARGET RICH ENVIROMENT.**

# PROJECTILE, 155MM, HE, M483A1

M42

CROSS SECTION
OF PAYLOAD

OGIVE WITH SELF
REGISTRATION ASSEMBLY

# CHARACTERISTICS OF THE DPICM PROJECTILE

- HAS IT'S OWN TFT : BECAUSE SHELL DPICM IS THE HEAD OF A DIFFERENT TYPE OF SHELL FAMILY, IT HAS IT’S OWN TFT. (FT 155-AN-2)
- THIS TFT IS USED TO DETERMINE GRAZE BURST DATA FOR DPICM SHELL FAMILY.
- EACH SPECIFIC SHELL HAS AN ADDENDUM , OR TABLE OF CORRECTIONS, TO ENSURE THAT THE SHELL FUNCTIONS THE CORRECT HEIGHT OF BURST.

# BASE EJECTS SUB MUNITIONS OVER THE TARGET AREA ( 88 GRENADES )

**HAS A TWO PART TRAJECTORY**

- **THE FIRST PART BEGINS WHEN THE SHELL IS FIRED FROM THE HOWITZER AND ENDS WHEN THE FUZE FUNCTION ABOVE THE TARGET.**

- **THE SECOND PART BEGINS WHEN THE GRENADES ARE BASE – EJECTED, FROM THE SHELL AND ENDS WHEN THE GRENADES IMPACT ON TGT.**

# MANUAL DPICM COMPUTATIONS

- FT 155-AN-2 AND ADD-J
- GFT 155-AN-2 AND ADD-J
- FT 155-AM-2 OR GFT 155-AM-2 AND ADD-R
- GFT 155-AM-2 WITH A GFT SETTING AND ADD-R

# GFT 155 -AM-2 WITH GFT SETTING AND ADD-R

- THIS IS THE PREFERRED METHOD AND THE ONE WE WILL DISCUSS IN DETAIL TO LEARN HOW TO DETERMINE FIRING DATA FOR THE DPICM PROJECTILE.

# TURN TO PAGE 39 ,PE #1

- APPLY GFT SETTING
- RECORD THE CFF AND THE FIRE ORDER.
- DETERMINE AND ANNOUNCE THE MTO.
- DETERMINE AND RECORD THE FIRE COMMANDS.
- DETERMINE SUBSEQUENT FIRE COMMANDS.

# QUESTIONS

# ?

# YOUR ON PE TIME

# ILLUMINATION

# CHARACTERISTICS OF ILLUMINATION

- 1,000,000 CANDLE POWER.
- ILLUMINATES AN AREA WITH A RADIUS OF 500 METERS.
- 600 METER OPTIMUM HEIGHT OF BURST.

# USES OF ILLUMINATION

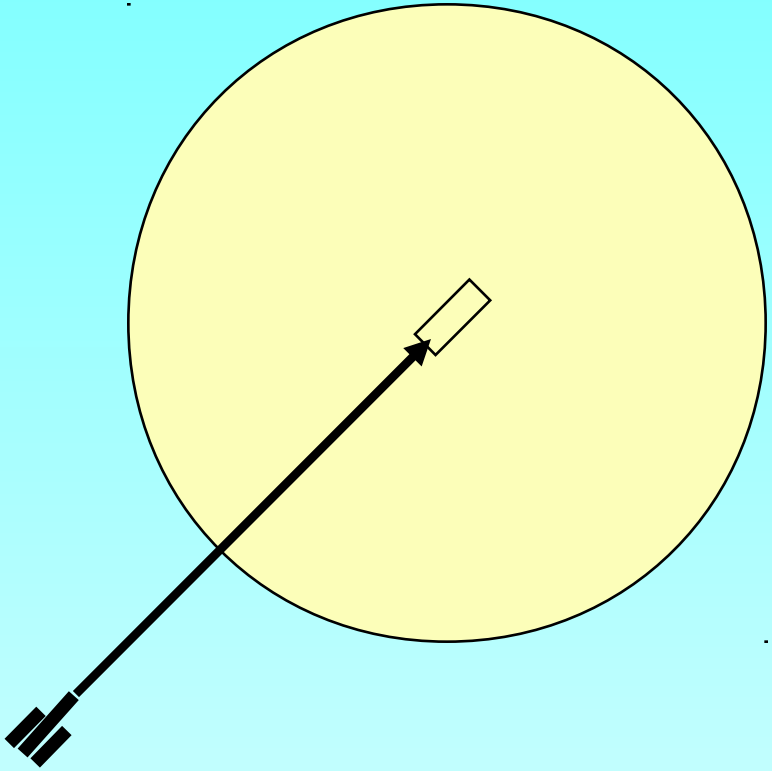
- SUSPECTED ENEMY MOVEMENT
- PROVIDE ILLUMINATION FOR NIGHT ADJUSTMENTS OR SURVEILLANCE OF ARTILLERY FIRE
- HARRASSING ENEMY POSITIONS OR INSTALLATIONS
- FURNISH DIRECTION TO FRIENDLY TROOPS FOR ATTACKS OR PATROL ACTIVITIES

# USES OF ILLUMINATION (Cont.)

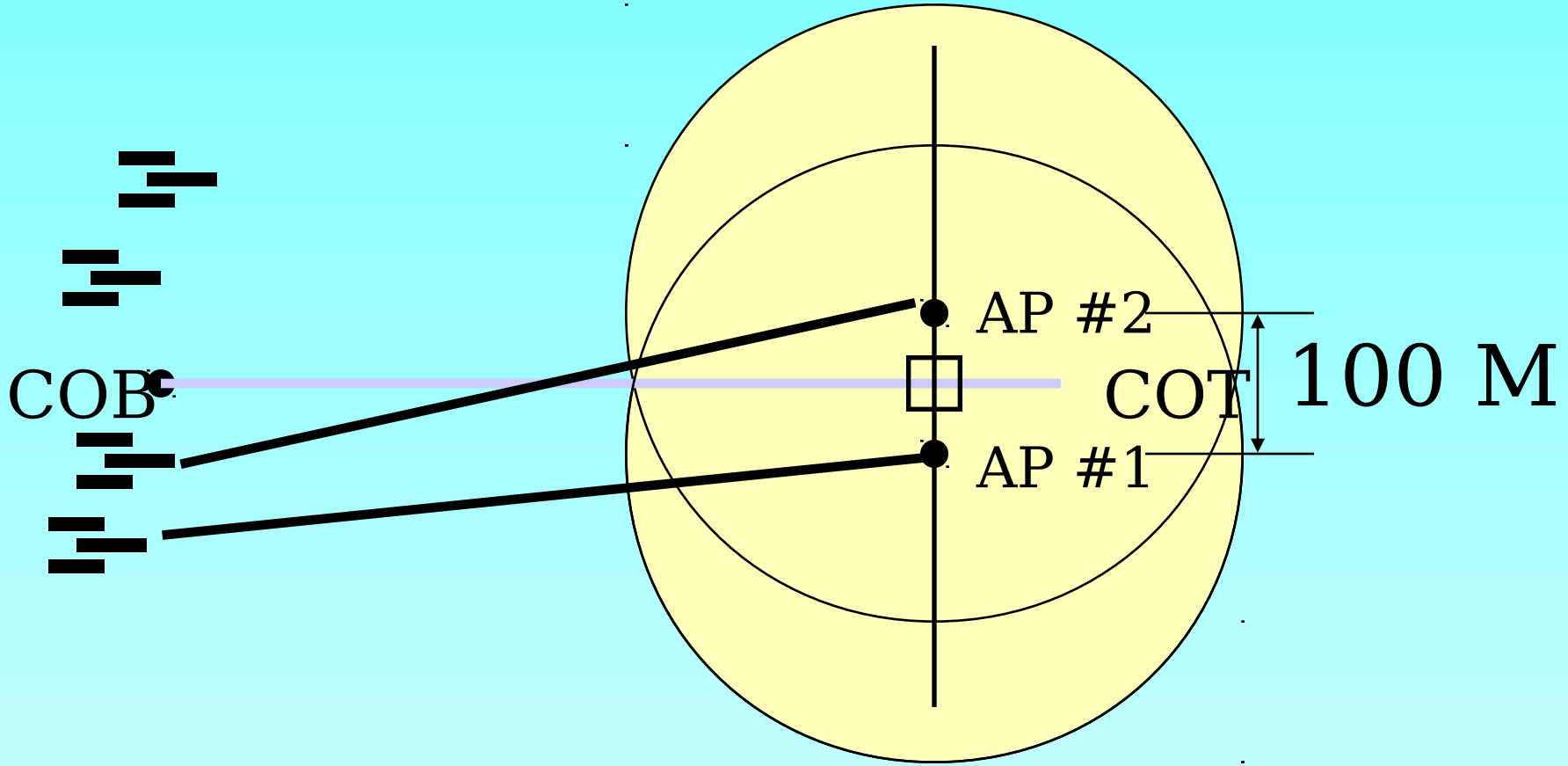
- GUIDING LOW LEVEL TACTICAL BOMBERS TO IMPORTANT TARGETS
- FURNISH VISIBILITY FOR DIRECT FIRE WEAPONS

# QUESTIONS ?

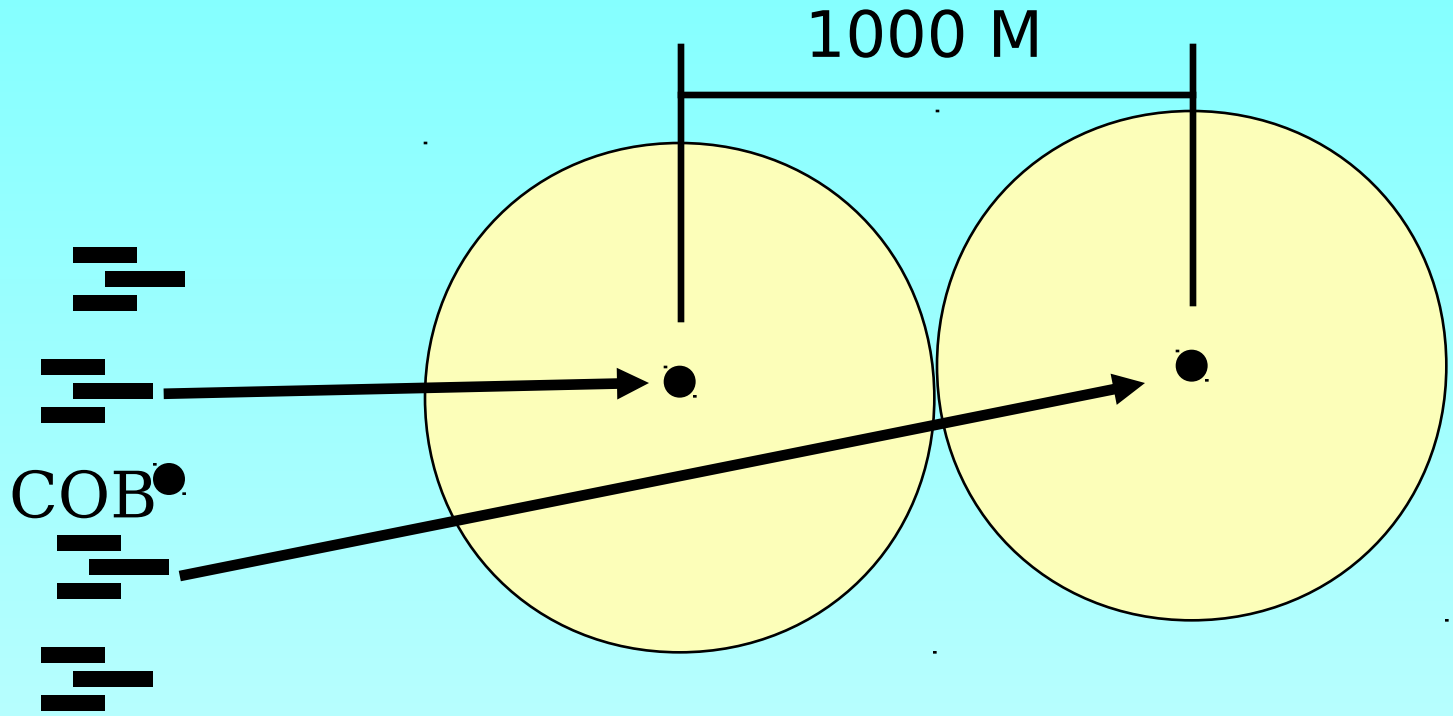
# ONE GUN ILLUMINATION



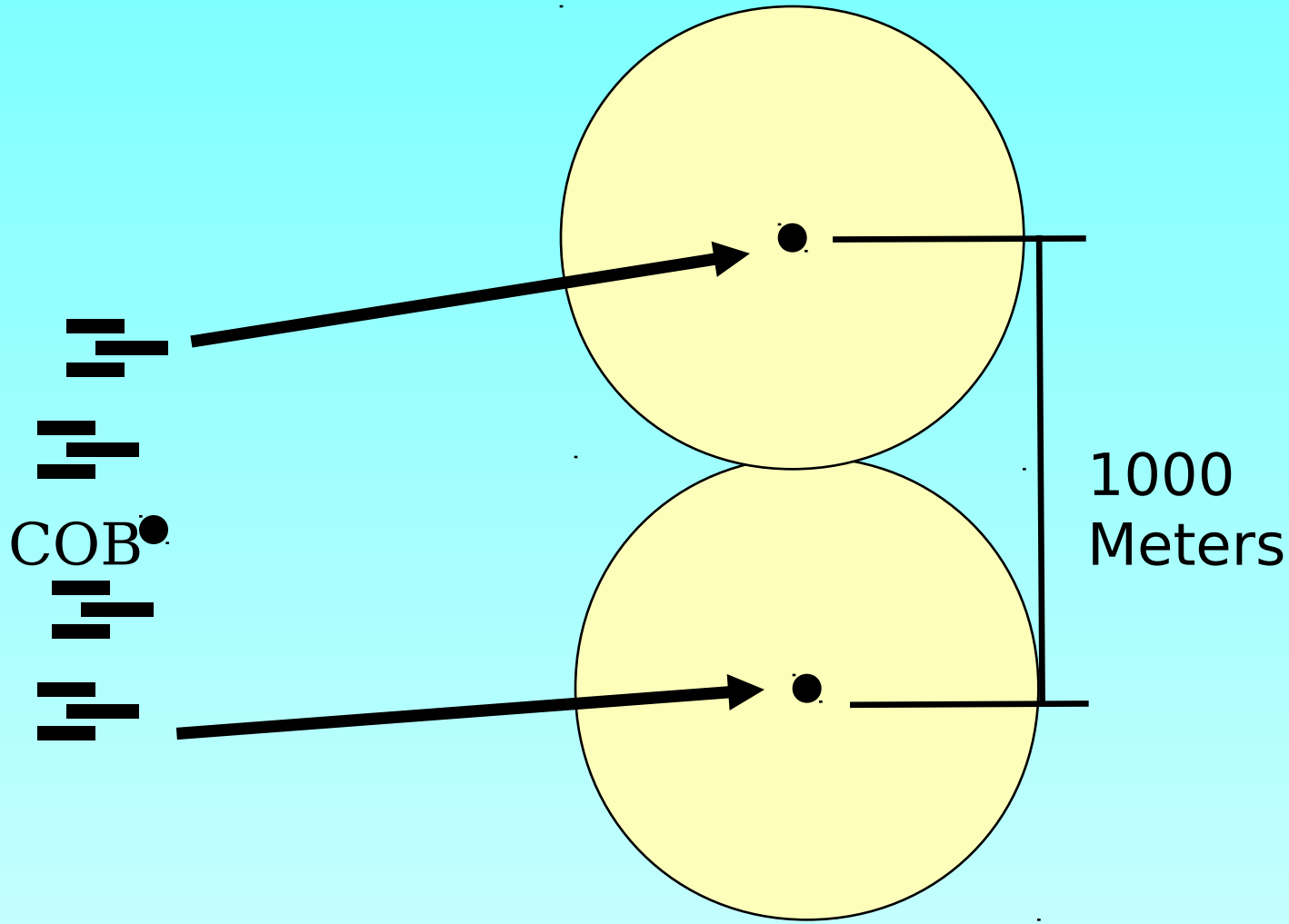
# TWO GUN ILLUMINATION



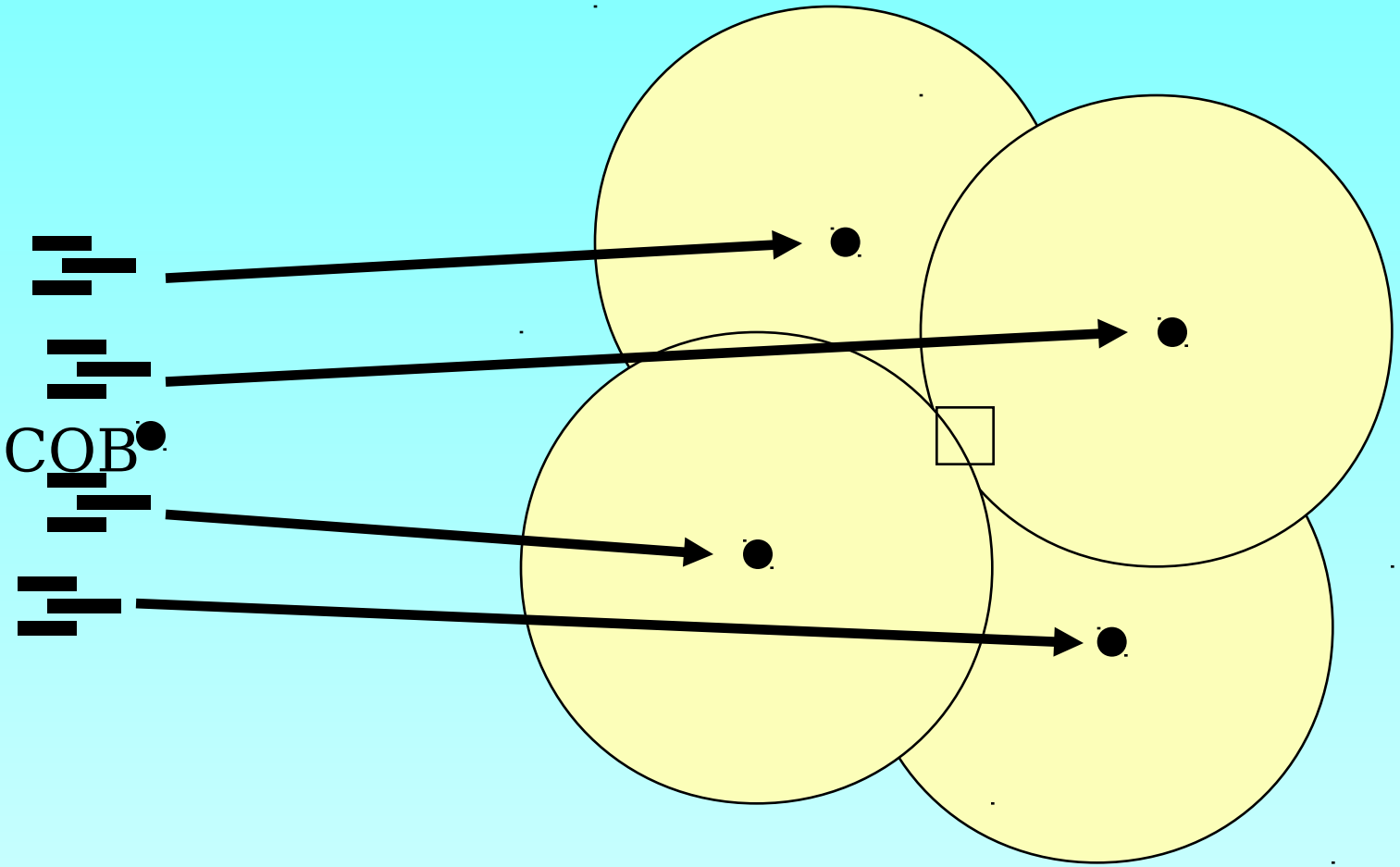
# TWO GUN RANGE SPREAD



# TWO GUN LATERAL SPREAD



# FOUR GUN RANGE & LATERAL SPREAD



# 155-MM ILLUMINATING GFT

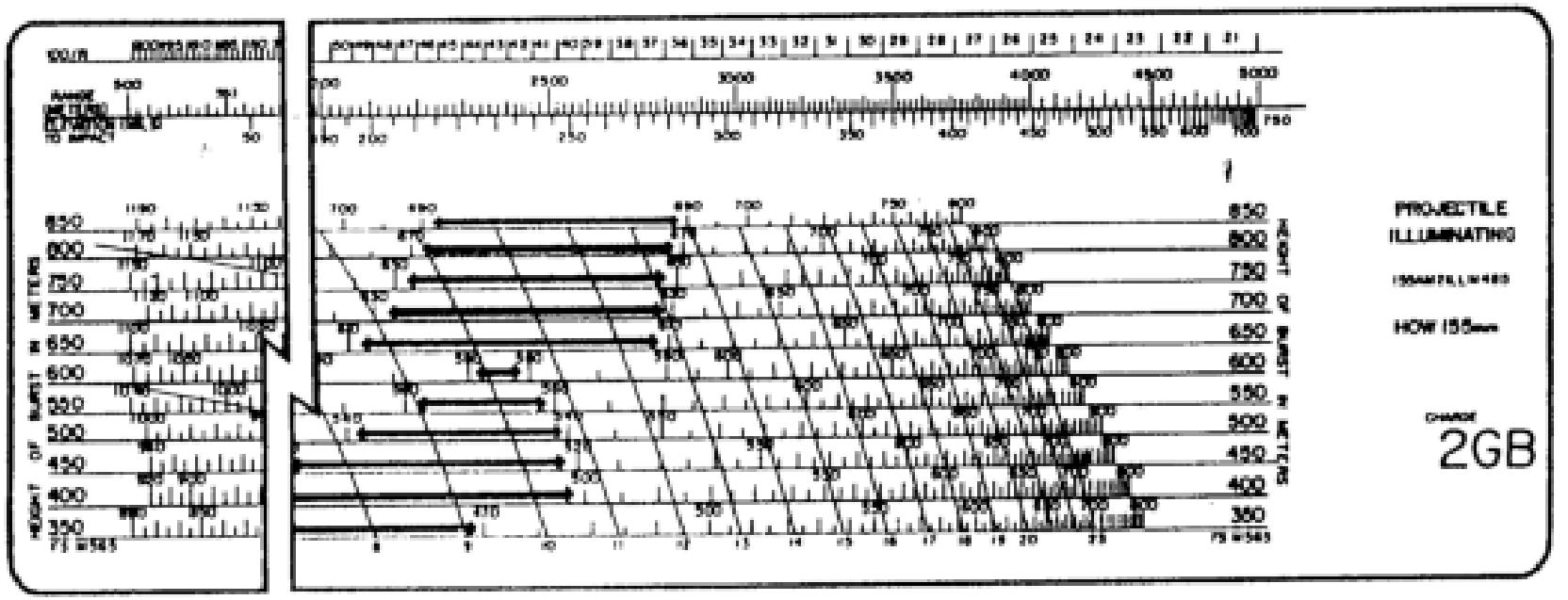



Figure 9-22. 155-mm Illuminating GFT.

# ILLUM PE #1 PAGE 57

**CFF**: H14 de H20 AF over
GRID 617327 over
SUSP CONVOY ILL RG & LAT SPD over

**FIRE ORDER**: L&R PLTS 1RD LOT IG CHG 2 AMC

INTIAL DATA: CHT RG 1560 CHT DF 3326

QUESTIONS
?

# Take a break!

# You're on PE time!